AMENDMENTS TO THE SPECIFICATION

Please amend the specification by substituting pages 1through 8 with the pages enclosed herewith.

METHOD AND APPARATUS FOR PREVENTING UNAUTHORIZED ACCESS TO A VEHICLE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of United States Patent Application Serial No. 60/196,301, filed April 12, 2000.

FIELD OF THE INVENTION

The present invention relates to an apparatus and method for preventing unauthorized access to a vehicle and more particularly, the present invention relates to a device for preventing the theft of a vehicle.

BACKGROUND OF THE INVENTION

Generally speaking, the theft of vehicles such as snowmobiles, ATVs, watercrafts, motorcycles and other vehicles having a magneto/stator present in the motor system is fairly straightforward, much to the demise of the owners of such vehicles. This is also a problem for automobiles despite the fact that they do not include a magneto or stator.

The simplicity in, for example, starting the motors of these vehicles is realized by the arrangements used to link the ignition system to the ignition generator coil. In snowmobiles, for example, the block connectors electrically connect the ignition switch, kill switch and power accessories to the ignition switch. These elements are all exposed outwardly of the motor. To the skilled thief, since these elements are readily accessible, bypass is simple and can typically be achieved in seconds. The result is that the vehicle can be easily started and driven away with ease and with a minimum of effort.

In an attempt to speak to the escalation in theft of these vehicles, many devices have been proposed in the art which attempt to provide the user/owner with a greater degree of security. The arrangements known incorporate alarms, keylock systems, manual circuit interrupts *inter alia*. These devices, although somewhat useful, are all limited by the same vulnerability, namely the fact that they are external systems which are accessible by a thief and therefore are easily disabled by bypass or "hot wiring".

In the case of snowmobiles, track locks have been proposed. These devices are simply not pragmatic; the user is confined to carrying these bulky awkward items on the snowmobile which requires storage space. This space is often at a premium in view of the size of the snowmobile.

A current manufacturer has offered a digital system (for selected models) and even though its method has a level of effectiveness, it is still vulnerable by its external application. Accordingly, the owner of earlier model vehicles is not helped by the new technology.

Other systems for preventing theft of watercraft include markings on the craft itself or special indications on the hull identification plate. These attempts at preventing theft can be easily circumvented by simply removing and replacing the plates or altering the information thereon.

In terms of automobiles, steering wheel arrangements such as the Club™ are typically employed. These devices are somewhat useful, but are easily ~~removeable~~ removable by determined thieves.

Immobilizers are also used in automobiles for theft prevention, but are limited by their external disposition.

In view of the fact that the vehicles are expensive, a more sophisticated method and apparatus is required which is not external of the motor or engine and which does not employ interceptable digital streams.

The present invention addresses this need and thus one object of one embodiment of the present invention is internal and therefore offers a security system which is substantially inaccessible to tampering.

SUMMARY OF THE INVENTION

One object of the present invention is to provide an improved apparatus and method for preventing unauthorized access to and ultimately the theft of a vehicle.

A further object of the present invention is to provide a method for preventing unauthorized access to a vehicle having a motor, a power source for the motor, a magneto

and a stator housed within a housing and an ignition generator coil connected in electrical communication with the magneto, comprising the steps of:

providing an ignition generator coil interrupt circuit electrically connected to the ignition generator coil, the circuit for selectively interrupting power to the ignition generator;

mounting the ignition generator coil interrupt circuit directly within the housing;

providing switch means connected to the circuit for allowing power interruption to the ignition generator coil; and

activating the switch means to interrupt power to the ignition generator coil and disabling engine starting.

Generally speaking, the vehicles incorporating stator/magneto arrangements include watercraft, all terrain vehicles, snowmobiles, among others.

As a particular convenience, the switch means may be selected from any suitable switching devices, such as mechanical, electrical, electro-mechanical, electronic (digital) arrangements. The important feature is that the circuit (*supra*) is positioned within the housing as opposed to externally; this latter arrangement is what limited the effectiveness of the prior art.

Another object of one embodiment of the present invention is to provide an arrangement for preventing unauthorized access to a vehicle, comprising:

a vehicle, the vehicle having a power source, a magneto and a stator housed within a housing and an ignition generator coil in electrical communication with the magneto;

an ignition generator coil interrupt circuit electrically connected to the ignition generator coil, the circuit for selectively interrupting power to the ignition generator, the circuit positioned directly within the housing; and

switch means connected to the circuit for allowing power interruption to the ignition generator coil for disabling the motor.

Mounting location for the circuit is conveniently anywhere within the housing with a suitable connection to the ignition generator coil. As a useful position, the circuit may be positioned between the stator and magneto~~, although this is not critical~~.

A still further object of one embodiment of the present invention is to provide an assembly for use with a vehicle having a motor, a power source for the motor, a magneto, a

stator and an ignition generator coil in electrical communication with the magneto, the assembly for preventing unauthorized access to a vehicle, comprising:

a stator plate;

mounting means on the stator plate for mounting the ignition generator coil;

circuit means for selectively interrupting power to the ignition generator coil, the circuit configured for positioning on the stator plate; and

switch means connected to the circuit for allowing power interruption to the ignition generator coil for disabling the motor.

In the embodiment noted above, the assembly could be provided as a kit for retrofit applications and easily be used for watercraft, snowmobiles, all terrain vehicles, *inter alia*.

As a further object of one embodiment of the present invention, there is provided a method for preventing unauthorized access to a vehicle having an engine and block therefor, sensors for effecting engine activation, a power source, ignition coils, and means for establishing electrical communication between the sensor and the coils, the method comprising the steps of:

providing switch means for interrupting power delivery to the sensors;

positioning the switch means between at least one sensor of the sensors and the means for establishing electrical communication between the sensors and the coils;

mounting the switch means to the at least one sensor; and

activating the switch means to interrupt power delivery to the sensors.

The means for establishing electrical communication between the sensors and coils is known in the art as an ECM motherboard. In current arrangements the ECM motherboard in automobiles is externally mounted of the engine and thus is vulnerable to tampering. If removed and replaced with a similar component not equipped with a theft deterrent (immobilizer) auto theft is easily achieved.

By providing the switch arrangement and mounting location, the presence of an ~~immoblized~~ immobilized ECM motherboard is of no consequence; the arrangement discussed *supra* interrupts power to the sensors leading to the ECM motherboard and further is mounted at least partially within the engine block to avoid tampering, bypass or ~~expeditions~~ expeditious removal.

As a particularly attractive advantage, the switch means may be integrally mounted to the sensor or a plurality of sensors. By providing several such switches, security for preventing unauthorized access may be augmented.

It will be readily apparent to those skilled that the vehicles having stator/magneto arrangements could easily be adopted to the circuit mentioned above where the stator/magneto is removed in future modifications of such vehicles.

Having thus described the invention, reference will now be made to the accompanying drawings illustrating preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a typical engine of the vehicles set forth herein;

Figure 2 is a view similar to Figure 1 with the cover removed from the stator housing;

Figure 3 is a schematic diagram of the wiring of a typical snowmobile;

Figure 4 is a view similar to Figure 2 with the arrangement according to one embodiment installed;

Figure 5 is an abbreviated schematic diagram illustrating the positioning of the elements according to one embodiment of the present invention.

Figure 6 is a schematic diagram of the starting circuit for an automobile with the switch;

Figure 7 is a schematic illustration of a vehicle and positioning of various sensors; and

Figure 8 is a schematic diagram of the switch arrangement in relation to the sensor(s) and ECM motherboard.

Similar numerals in the figures denote similar elements

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings and particularly Figure 1, numeral 10 generally references the engine. There is provided a housing 12 for housing the magneto and stator. A cover 14 is fixed by fasteners 16 to provide a sealed stator/magneto housing. As is generally known, specialized tools and skill are required to remove the cover 14 and eventually gain access to the interior of the housing 12.

Figure 2 illustrates the interior of the housing 12 where there are mounted several coils 18_1 shown in the example as a quantity of five. A main coil or ignition generator coil 20 is also provided and is integral in starting the engine. It is known that such coils generally operate on the principle of sensors. Coil 20 has two leads 22 and 24 which terminate at a block connector 26. Block connector 26 also includes leads, generally referenced by numeral 28, leading to the CDI box (not shown). A mating block connector 30 connects to block connector 26 and the former provides leads to the ignition switch, kill switch and power accessories (none of which is shown) of the vehicle (not shown).

The arrangement is generally well known in the art. Unfortunately, it is also well known that by simply disconnecting the block connectors 26 and 30, all security systems typically associated with the vehicle are disabled while a signal is still capable of being supplied to the CDI box from the ignition generator coil 20. Accordingly, the vehicle will start in this condition.

Figure 3 illustrates a typical schematic diagram for a conventional snowmobile, although the diagram is applicable to typical magneto/stator motors. As the diagram illustrates, the disposition of the ignition generator coil 20 in the circuit facilitates easy starting of the engine when the block connectors 26 and 30 are disconnected.

Figure 4 illustrates an example of the invention as positioned within the housing 12. A switch 32 is disposed in housing 12 and in this case is an electrical/mechanical switch. Figure 5 illustrates a truncated schematic of the circuit of Figure 4 showing the positioning of the switch 32 and its relationship to ignition generator coil 20. As illustrated, the switch 32 includes leads 34 and 36, with lead 34 being connected to ignition generator coil 20 and lead 36 extending to other electrical connections related to starting the vehicle. By connection to ignition generator coil 20, the circuit is interrupted in the OFF position and is unaffected by disconnection of block connectors 26 and 30. Accordingly, the user, in order to start the

ignition generator coil 20, the circuit is interrupted in the OFF position and is unaffected by disconnection of block connectors 26 and 30. Accordingly, the user, in order to start the vehicle must initially actuate the switch 32 into the ON position with, for example, a key 38 which, in turn, will re-enable the ignition generator coil 20. Once this is done, normal procedures may be performed to start the vehicle.

In the embodiment of Figure 4, a switch is mounted in the housing 12 adjacent the ignition generator coil 20. This is not essential. In the situation where the switch system comprises a remotely controllable arrangement, the switch may be replaced by a receiver (not shown) well known in the art. In these devices an antenna can be positioned in any convenient location provided it can communicate with a transmitter (not shown). It will be appreciated to those skilled in the art that any suitable switch capable of selectively interrupting the ignition generator coil circuit may be used.

Advantageously, by positioning the circuit interrupt portion of the switch within the housing, tampering or bypass is difficult, tedious and would more than likely damage the vehicle if a thief attempted any tampering. Further, if the switch mechanism is damaged, broken or removed, the vehicle cannot be made to start unless original wiring is restored. Cover 14 is removed and the switch 32 removed from the vehicle. This is obviously time consuming and cannot be performed with any degree of stealth.

~~Referring now to Figures 6 through 8, Figure 6 illustrates a schematic diagram of the overall circuit and more particularly the positioning of the switch within the conventional elements of a starting circuit for an automobile.~~

In Figure 7, a vehicle 50 is shown and includes an engine and an engine block, broadly denoted by numeral 51. As is known, a number of sensors are required to carry out various functions with respect to the operation of the vehicle. In the example, numeral 52 represents a camshaft position sensor, numeral 54 represents a crankshaft position sensor and numerals 56 through 70 represent other sensors, amplifiers, *inter alia*.

As is illustrated in Figure ~~6~~7, disposed between engine 51 and sensors 52 through 70 is a switch 51′. The sensors 52 through 70 are in electrical communication with an ECM motherboard 72 which is responsible for numerous functions, the most important of which for purposes of this discussion is communication between the sensors and ignition coils 74 and

76. As is known, coils 74 and 76 each communicate with cylinders 78, 80, 82, and 84, respectively.

By providing power interruption via switch 51′ to the sensors 52 through 70, the ECM motherboard 72 is inconsequential as to whether the ECM motherboard 72 is equipped with anti-theft provisions such as an immobilizer (not shown). This is a significant advantage since the sensors are effected by the switch 51′ as opposed to the ECM motherboard 72. By effecting the sensors 52 through 70, the ECM motherboard 72 is also effected. This is a more effective system since it does not matter whether the ECM motherboard includes anti-theft provisions.

The sensors, and particularly those shown in Figure 6, i.e. sensors 52 and 54 are typically at least partially mounted within the engine block 51 as is generally depicted in Figure 7. By ~~mounting~~ connecting the switch 51′ to all or some of the sensors 52 through 70, the switch is therefore at least partially mounted in the engine block 51 and therefore present significant difficulty for potential thieves to tamper with the arrangement. This is in marked contrast to the disposition of the ECM motherboard 72 which is easily accessible.

In this manner, the sensors 52 through 70 and the switch 51′ (of which there may be several) can be integrated as a single unit. This arrangement is shown in Figure 8 where the switch 51′ and sensor 52 are unified as a single unit. Figure 8 also shows in dashed line the possibility of augmenting security by linking various switches and sensors in tandem.

Although embodiments of the invention have been described above, it is not limited thereto and it will be apparent to those skilled in the art that numerous modifications form part of the present invention insofar as they do not depart from the spirit, nature and scope of the claimed and described invention.